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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,209	07/24/2003	Irving W. DeVoe	41056-101	9677

26486 7590 11/20/2009

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EXAMINER	
MENON, KRISHNAN S	

ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
11/20/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/626,209	DEVOE, IRVING W.	
	Examiner	Art Unit	
	Krishnan S. Menon	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *42,47,48,50-52,68 and 71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *42,47,48,50-52,68 and 71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 42, 47, 48, 50-52, 68 and 71 are pending as appealed 9/29/09 Claims 42 and 50 are independent.

In view of the **appeal breif** filed on **9/29/09**, PROSECUTION IS HEREBY REOPENED to include an **additional rejection as** set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Vickie Kim/

Supervisory Patent Examiner, Art Unit 1797

Vickie Kim, SPE

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 42, 47, 48, 50-52, 68 and 71 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a lower pressure in the first chamber, does not reasonably provide enablement for creating a void or vacuum. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The system as envisaged in the claims, a void and a vacuum in the first chamber is not possible because the pressure cannot go below the vapor pressure of the solvent (water), which would evaporate and fill the space, creating a vapor lock, which would stop the system from working. The vapor lock would prevent a steady supply of solvent, and/or the solvent from reaching the membrane for osmosis to take place.

Applicant does describe various scenarios in the specification of operating with vacuum in the solvent chamber (as in fig 6 or 9). The vacuum in these instances are shown as remote from the membrane. This is hydraulically and thermodynamically not possible, because the membrane creates a flow of solvent from upstream of the membrane towards the membrane. If there is a vacuum at the upstream end of the solvent chamber remote from the membrane, the pressure of solvent at the membrane would be even lower than the vacuum at the upstream end of the solvent chamber. This is because the flow through the membrane will generate a pressure drop along the

solvent flow path (or, a driving pressure differential is needed to make the liquid flow along the solvent flow path towards the membrane). This means the liquid at the membrane would not remain as liquid, but would evaporate, thus generating a vapor block. To break the upstream vacuum in the solvent chamber and make the liquid flow to the membrane, there will have to be a vertical column of liquid (about 30 feet for water at ambient conditions) that has a height greater than the vapor pressure of the liquid (water) in the solvent chamber, without which the liquid would simply not move towards the membrane. Thus, there will be only vapor at the membrane and osmosis would stop.

Claim Rejections - 35 USC § 102/103

1. **Claims 42, 47,48, 50-52, 68 and 71 are rejected under 35 U.S.C. 102(b) as being anticipated by, or under 35 USC 103(a) as being obvious over, Loeb (US 3,906,250).**

Loeb'250 teaches (see figures) a method of producing energy from a system having a semipermeable barrier separating a pressure chamber and a solvent chamber, wherein the pressure chamber has a solution (sea water) and solvent chamber has a solvent (river water), the solvent flows from the solvent chamber to the pressure chamber across the membrane, and the solvent chamber thus would inherently have a reduced pressure or even vacuum. See also figure 11, which is a closed system with the solvent chamber having only inflow, wherein the solvent chamber is at zero pressure. The solute solution is evaporated with external heat (like solar) in a third

chamber – see figure 6 for example – and the solute is recycled as a concentrated solution.

With respect to the limitation,

> utilizing the semi-permeable barrier to restrict solute from flowing into the first chamber while allowing the solvent to flow into the second chamber as the solvent flows from the first chamber into the second chamber a void is created in the first chamber such that a vacuum develops in the first chamber and increases the pressure in the diluted solute solution in the second chamber;

the creation of the void and the increase in pressure in the diluted solute solution in the second chamber are inherent in the process of natural osmosis, and are not patentable process steps. Any reduction in pressure in this chamber is limited by the vapor pressure of the solvent, and no further reduction in pressure can be expected.

Periodically applying and removing pressure to drive a member to produce movement is taught by the reference - see the figures for the various energy conversion schemes. The 'periodically applying' can mean anything from occasional start and stop to a reciprocating system, and such schemes of energy conversion are within the capability of one of ordinary skill in the art to design. Also, the turbine is a moving member and it moves to produce work in response to the expanding solute solution.

With respect to claim 50, a displacement of an object, such as a piston, is implied in the reference to a piston in column 11, lines 37-59.

The solvent chamber is pressurized by pumps.

2. **Claims 42, 47,48, 50-52, 68, and 71 are rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 USC 103(a) as being obvious over DE 3121968.**

DE teaches a method of pressurizing a solute solution and converting the pressure to energy (by a turbine or by a reciprocating machine, which is a piston machine: see claims 22, page 8, and 28, page 9 of the English translation of the reference; piston in the reciprocating machine has linear displacement) using a solvent by passing the solvent across into the solution through a semipermeable membrane – see figures. The solution is exhausted after the pressure is converted to energy as claimed. Solvent chamber pressure reduces due to loss of solvent by osmosis, which would inherently create a loss of pressure, or vacuum, as discussed above. The solvent chamber (5) is pressurized by a pump – see figure 1, pump 22. In the figures, for example, figure 1, solvent chamber is (5), solution chamber is (6), and the membrane is (4).

DE teaches solvent and solute recycle; and that the process of evaporation can be optimally selected from the various available methods – see pages 16-20 of the English translation (especially, page 18) – including air circulation, heat pump, and solar energy. Using vacuum for evaporation, particularly at ambient temperature, is known in the art. Even though the reference does not explicitly teach a third chamber, it is implied in terms of evaporation ponds or evaporators and condensers required in the various recycling schemes contemplated by the reference, which include both solvent and concentrated solute solution.

For further evidence for the recycling of the solute and the solvent, see Loeb above in rejection 1. Therefore, if the teaching of DE is not considered as anticipating the claims, it would be obvious to one of ordinary skill to recycle the solvent and solute as is well known in the art.

"Periodically applying and removing the increased pressure" to drive a member to produce work can mean anything from occasional start and stop of a system to a reciprocating system. The reference teaches both turbine and reciprocating engines for energy conversion. Actual details to how to set up the system would be within the sill level of one of ordinary skill in the art. The claimed invention does not provide any details that would make the claim patentable over the prior arts.

3. **Claims 42, 47, 48, 50-52, 68 and 71 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Prueitt (US 6,185,940).**

Prueitt fig 3 is reproduced below.

Osmotic membrane (65) separates two sealed chambers (63) and (64) in stage 2. The chambers are sealed because their inlets and outlets can be isolated by valves or other devices in the inlets and outlets. The solution chamber 64 has a solute solution which is diluted by fresh water from chamber 63 moving across membrane 65 by osmosis, which increases the solution pressure. This moves interface 9' to fill chamber 8A'. The turbine 21' also simultaneously produced energy.

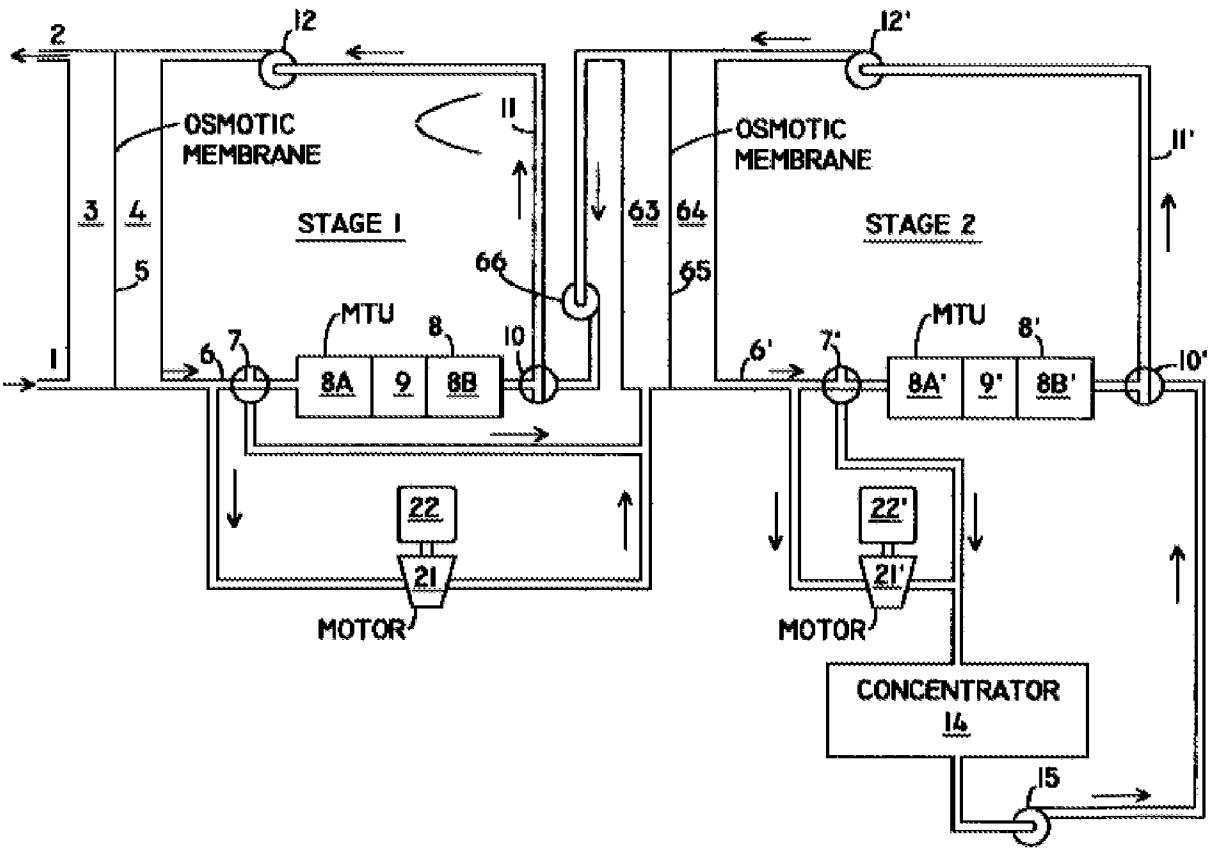

Figure 3

Interface 9 or 9' is a piston or other movable interface (column 4, lines 1-2). Concentrator 14 is the third chamber which evaporates water to concentrate the brine, which is recycled to chamber 64 via chamber 8B'. For more details of operation of the Prueitt system, see column 3, line 39 – column 4, line 41 and column 5, line 47 – column 6, line 34.

Pressure of the solute solution leaving the chamber 64 is high, and the pressure of the solution coming into 64 is low – see column 6, lines 15-25.

Pressure is applied and removed periodically to the piston 9' to extract work – it extracts work because its movement pumps concentrated solution from the concentrator to the solution chamber 64.

The turbine 21' is also a moving member, which extracts work.

Regarding the vacuum or low pressure in chambers 3 or 63 produced as water moves into the solution chamber through the membrane, the reference is silent on any vacuum produced, but vacuum or low pressure would be inherently produced as water moves from chambers 3 or 63 to 4 or 64 as is expected from the principles of osmosis, even though a complete vacuum is not possible because water would evaporate and create a vapor lock if the pressure drops below the vapor pressure of water. Such a vapor lock would stop the system from working.

Solvent chamber is being pressurized by a pump mechanism (8).

Recycling the solvent in the first chamber is taught by Prueitt – see stage 1 in Fig 3.

Condensing and recycling solvent would be obvious to one of ordinary skill in the art.

Response to Arguments

The arguments presented in the brief had been repeatedly answered in the prior office actions. The prosecution was reopened to introduce the new grounds for rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Krishnan S Menon/
Primary Examiner, Art Unit 1797